CHAPTER TWO

TROUBLESHOOTING

Begin any troubleshooting procedure by defining the symptoms as precisely as possible. Gather as much information as possible to aid diagnosis. Never assume anything and do not overlook the obvious. Make sure there is fuel in the tank, and the fuel valve is on. Make sure the engine stop switch is in the run position and the spark plug wire is attached to the spark plug.

If a quick check does not reveal the problem, turn to the troubleshooting procedures described in this chapter. Identify the procedure that most closely describes the symptoms, and perform the indicated tests.

In most cases, expensive and complicated test equipment is not needed to determine whether repairs can be performed at home. A few simple checks could prevent an unnecessary repair charge. On the other hand, be realistic and do not attempt repairs beyond your capabilities. Many service departments do not take work that involves the re-assembly of damaged or abused equipment. If they do, expect the cost to be high.

WATER DAMAGE

Water damage is a common cause of ATV repair. If the vehicle is regularly operated in wet conditions, the brakes, cables, wheel bearings, gearcase oil and engine oil may need to be serviced more often than specified. In addition, corrosion my increase the likelihood of electrical problems. Regular cleaning and lubricating greatly extends the life of a vehicle run in these conditions.

CAUTION

If the engine oil or gearcase oil becomes contaminated with water it foams and/or has a whitish appearance. Frequently this is evident by condensation on the inside of the fill cap. Immediately flush any contamination with repeated fluid changes until all traces of moisture are gone. Oil diluted with water does not lubricate properly and quickly leads to costly repairs.

If mud is in the air box, it is usually an indicator that the vehicle has been submerged in water. If the vehicle has been submerged and no longer runs, perform the following maintenance items:

1. Drain the fuel tank.
2. Clean the carburetor.
3. Drain and replace the engine oil.
4. Remove the spark plug. Crank the engine over to remove any water.
5. Clean the air box.
6. Clean or replace the air filter.
7. Lubricate the cables.
8. Clean the brakes and check the brake fluid for contamination.
9. Drain and replace the gearcase oil.

ENGINE OPERATING REQUIREMENTS

An engine needs three basic requirements to run properly: correct air/fuel mixture, compression and a spark at the proper time. If any one element is missing, the engine does not run. **Figure 1** shows four-stroke engine operating principles.

ENGINE STARTING

CAUTION
When trying to start the engine, do not operate the starter for more than 5 seconds at a time. This can overheat the starter. Wait approximately 10 seconds before operating the starter again.

Cold Engine

1. Shift the transmission to neutral and set the parking brake.
2. Turn the ignition switch on.
3. Turn the fuel valve on.
4. Pull the choke knob all the way up (**Figure 2**).
5. With the throttle slightly open, push the starter button (A, **Figure 3**).

6A. If the ambient air temperature is normal (10-35° C [50-95° F]), perform the following after the engine has started:
   a. Move the choke knob to the halfway position.
   b. Warm up the engine by working the throttle slightly.

6B. If the ambient air temperature less than 10° C (50° F), perform the following after the engine has started:
   a. Work the throttle slightly to keep the engine running.
   b. When the engine begins to idle roughly, move the choke knob to the halfway position.

7. Idle the engine for approximately 1 minute or until the throttle responds cleanly, and move the choke knob all the way down (off).

Warm or Hot Engine

1. Shift the transmission into neutral and set the parking brake.
2. Turn the ignition switch on.
3. Turn the fuel valve on.
4. Make sure the choke knob is all the way down (off).
5. Open the throttle slightly and push the starter button.

Flooded Engine

If the engine is difficult to start and there is a strong gasoline smell, the engine is probably flooded. If so, perform the following procedure.

WARNING
Because a flooded engine smokes badly when it first starts to run, start the engine in a well-ventilated area with its muffler pointing away from all objects. Do not start a flooded engine in a closed area.

1. Make sure the choke knob is all the way down (off).
2. Turn the engine stop switch off.
3. Hold the throttle fully open.
4. Clear the engine by briefly pressing the starter button several times.
5. Wait 10 seconds, turn the engine stop switch on and perform the normal starting procedures. If the engine is flooded badly, you may have to remove the spark plug and dry off its insulator, or install a new plug. When a flooded engine first starts to run, it initially coughs and runs slowly as it burns off the excess fuel. As this excess fuel is burned off, the engine revs quickly. Release the throttle at this point

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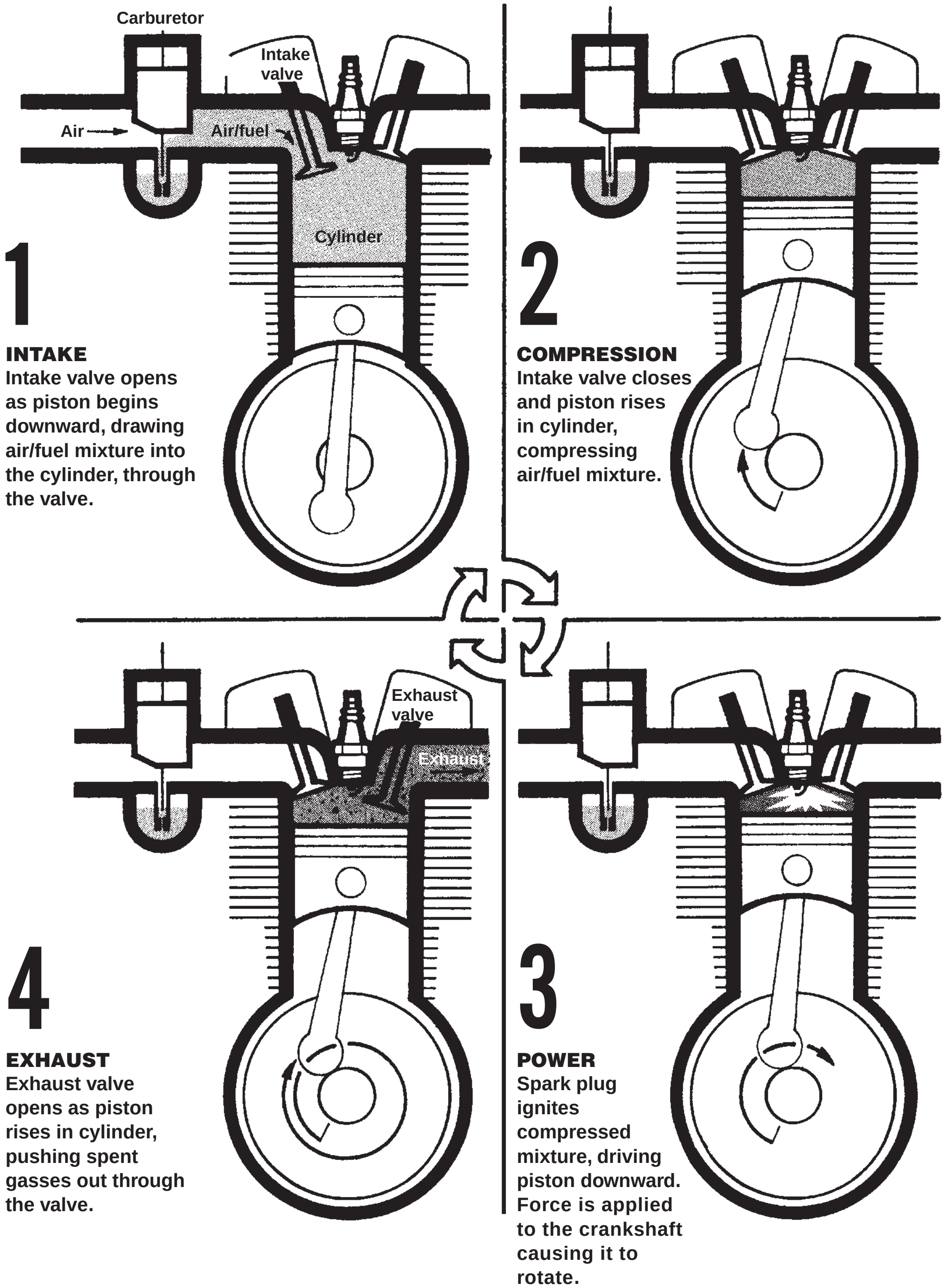
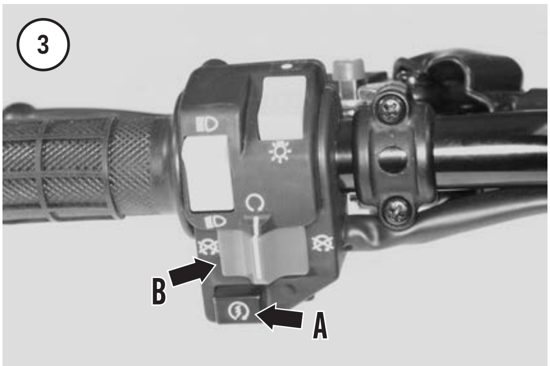
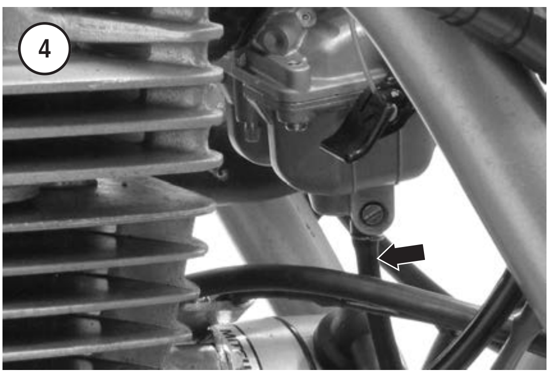
FOUR-STROKE ENGINE OPERATING PRINCIPLES







and work it slowly to make sure the engine is running cleanly.

NOTE
*If the engine refuses to start, check the carburetor overflow hose (**Figure 4**) attached to the fitting at the bottom of the float bowl. If fuel is running out of the hose, the float valve is stuck open or leaking, allowing the carburetor to overfill. If this problem exists, remove the carburetor and correct the problem as described in Chapter Eight.*

ENGINE WILL NOT START

An engine that refuses to start or is difficult to start is very frustrating. More often than not, the problem is minor and can be found with a simple and logical troubleshooting approach.

Refer to the following to isolate engine starting problems:

1. Check whether the choke knob is in the correct position. Refer to *Engine Starting* in this chapter.
2. Check whether fuel is in the tank. Fill the tank if necessary. If it has been a while since the engine has run, drain the tank and fill it with fresh fuel. Check for a clogged fuel tank vent hose (**Figure 5**). Remove the tube from the filler cap, and then wipe off one end and blow through it. Remove the filler cap and check for a plugged hose nozzle.

WARNING
Do not use an open flame to check in the tank. An explosion results.

3. Disconnect the fuel line (**Figure 6**) from the carburetor and insert the end of the hose into a clear container. Turn the fuel valve on. Fuel should flow

freely from the fuel hose. If no fuel comes out, the fuel valve may be shut off, blocked by debris, or the fuel cap vent may be plugged. Remove and clean the fuel valve (Chapter Eight) and fuel cap vent. Reconnect the fuel line to the carburetor fitting.

4. The cylinder may be flooded if there is a strong smell of gasoline, perform the procedures in *Flooded Engine* in this chapter.

5. Check the carburetor overflow hose on the bottom of the float bowl (**Figure 4**). If fuel is running from the hose, the float valve is stuck open or leaking. Turn the fuel valve off and tap the carburetor a few times. Then turn on the fuel valve. If fuel continues to run out of the hose, remove and repair the carburetor as described in Chapter Eight. Check the carburetor vent hoses to make sure they are clear. Check the end of the hoses for contamination.

NOTE

If fuel is reaching the carburetor, the fuel system could still be the problem. The jets (pilot and main) could be plugged or the air filter could be severely restricted. However, before removing the carburetor, continue with Step 6 to check the ignition system.

6. Make sure the engine stop switch (B, **Figure 3**) is operating correctly. Make sure the stop switch wire is not broken or shorted. If necessary, test the engine stop switch as described in *Switches* in Chapter Nine.

7. If the spark plug high-tension wire and cap (**Figure 7**) are tight on the spark plug, push and slightly rotate them to clean the electrical connection between the spark plug and the wire connector. Remove the cap from the plug, hold the high-tension wire and screw the plug cap on tightly.

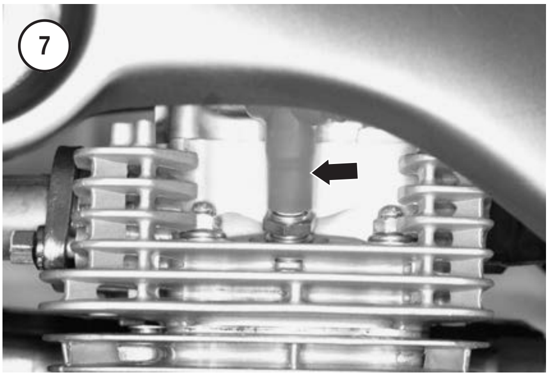
8. Perform the *Spark Test* described in this section. If there is a strong spark, perform Step 9. If there is no spark, or if the spark is very weak, troubleshoot the ignition system as described in this chapter.

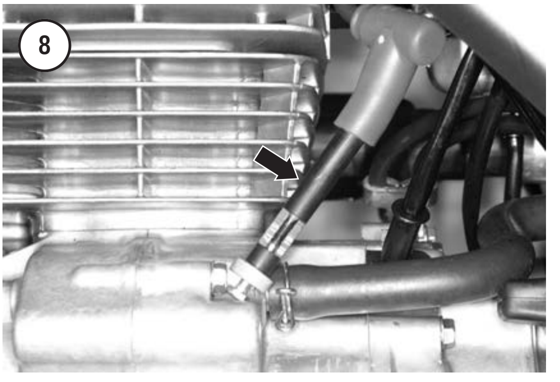
NOTE

A compression problem may still exist even though it seems good in the following test. If necessary, check the engine compression using a compression gauge as described in Chapter Three.

9. Check cylinder compression as follows:

a. Turn the engine stop switch (B, **Figure 3**) off.





b. Turn the fuel valve off.

c. Remove the spark plug and ground the spark plug against the cylinder head.

d. Place your finger over the spark plug hole.

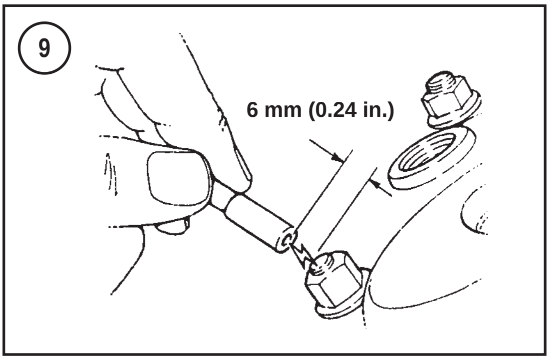
e. Operate the starter. When the piston comes up on the compression stroke, pressure in the cylinder should force your finger from the spark plug hole. If your finger pops off, the cylinder probably has sufficient compression to start the engine.

Spark Test

Perform the following spark test to determine if the ignition system is producing adequate spark. When checking spark, turn the engine stop switch to run and the ignition switch on.

CAUTION

Before removing the spark plug in Step 1, clean all debris away from the plug base. Dirt that falls into the cylinder causes rapid engine wear.



1. Disconnect the plug wire and remove the spark plug.

NOTE
*A spark tester (**Figure 8**) is a useful tool for checking the ignition system. This tool is inserted in the spark plug cap and its base is grounded against the cylinder head. Because the tool's air gap is adjustable, the intensity (sight and sound) of the spark can be observed while testing. A number of different spark testers are available through motorcycle and automotive parts stores. The spark tester shown in **Figure 8** is manufactured by Motion Pro (part No. 08-0122).*

2. If using an adjustable spark tester, set its air gap to 6 mm (0.24 in.).
3. Insert the spark plug (or spark tester) into the plug cap and touch its base against the cylinder head to ground it (**Figure 8**). Position the plug so the electrodes are in view.

WARNING
Do not hold or touch the spark plug (or spark tester), wire or connector when making a spark check. A serious electrical shock may result.

CAUTION
Mount the spark plug or spark tester away from the plug hole in the cylinder head so the spark from the plug or tester cannot ignite the gasoline vapor in the cylinder.

NOTE
*If the engine backfires when you attempt to start it, the ignition timing may be incorrect. Because the ignition timing is not adjustable, incorrect ignition timing can be caused by a loose flywheel, sheared flywheel key, loose ignition pulse generator mounting screws or connector or a damaged or defective ignition system component. Refer to **Ignition System** in this chapter.*

4. Turn the engine over with the starter button. A fat blue spark should be evident across the spark plug electrodes or across the spark tester terminals.
5. If the spark is good, check for one or more of the following possible malfunctions:
   a. Obstructed fuel line or fuel filter (if used).
   b. Low compression or engine damage.
   c. Flooded engine.
6. If the spark is weak (white or yellow in color) or if there is no spark, check for one or more of the following conditions:
   a. Fouled or wet spark plug. If there is a spark across a spark tester but not across the original spark plug, the plug is fouled. Repeat the spark test with a new spark plug.
   b. Loose or damaged spark plug cap connection. Hold the spark plug wire and turn the spark plug cap to tighten it. Install the spark plug into the cap and repeat the spark test. If there is still no spark, bypass the plug cap as described in the next step.
   c. Check for a damaged spark plug cap. Hold the spark plug wire and unscrew the spark plug cap. Hold the end of the spark plug wire 6 mm (0.24 in.) from the cylinder head as shown in **Figure 9**. If there is a strong spark, the spark plug cap is faulty. Replace the plug cap and repeat the spark test.
   d. Loose or damaged spark plug wire connections (at coil and plug cap).
   e. Faulty ignition coil or faulty ignition coil ground wire connection.
   f. Faulty ICM unit or stator coil(s).
   g. Sheared flywheel key.
   h. Loose flywheel nut.
   i. Loose electrical connections.
   j. Dirty electrical connections.

Electrical System

1. Spark plug:
   a. Fouled spark plug.

b. Incorrect spark plug gap.
c. Incorrect spark plug heat range (too cold). Refer to Chapter Three.
d. Worn or damaged spark plug electrodes.
e. Damaged spark plug.
f. Damaged spark plug cap or spark plug wire.

2. Ignition coil:
   a. Loose or damaged ignition coil leads.
   b. Cracked ignition coil body—look for carbon tracks on the ignition coil.
   c. Loose or corroded ground wire.
3. Switches and wiring:
   a. Dirty or loose fitting terminals.
   b. Damaged wires or connectors.
   c. Damaged ignition switch.
   d. Damaged engine stop switch.
4. Electrical components:
   a. Damaged ignition pulse generator.
   b. Damaged ICM unit.
   c. Faulty exciter coil.
   d. Sheared flywheel Woodruff key.

Fuel System

A contaminated fuel system causes engine starting and performance related problems. It only takes a small amount of dirt in the fuel valve, fuel line or carburetor to cause problems.

1. Air filter:
   a. Plugged air filter element.
   b. Plugged air filter housing.
   c. Leaking or damaged air filter housing-to-carburetor air boot.
2. Fuel valve:
   a. Plugged fuel hose.
   b. Plugged fuel valve filter.
3. Fuel tank:
   a. No fuel.
   b. Plugged fuel filter.
   c. Plugged fuel tank vent hose (**Figure 5**).
   d. Contaminated fuel.
4. Carburetor:
   a. Plugged or damaged choke system.
   b. Plugged main jet.
   c. Plugged pilot jet.
   d. Loose pilot jet or main jet.
   e. Plugged pilot jet air passage.
   f. Incorrect float level.
   g. Leaking or damaged float.
   h. Worn or damaged needle valve.

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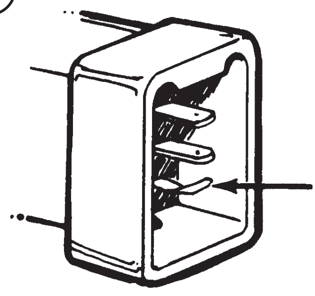

Engine Compression

Check engine compression as described in Chapter Three. To obtain a more accurate gauge of engine wear, perform an engine leakdown test as described in this chapter.

1. Cylinder and cylinder head:
   a. Loose spark plug.
   b. Missing spark plug gasket.
   c. Leaking cylinder head gasket.
   d. Leaking cylinder base gasket.
   e. Severely worn or seized piston, piston rings and/or cylinder.
   f. Loose cylinder and/or cylinder head fasteners.
   g. Cylinder head incorrectly installed and/or torqued.
   h. Warped cylinder head.
   i. Valve(s) adjusted too tightly.
   j. Bent valve.
   k. Worn valve and/or seat.
   l. Worn or damaged valve guide(s).
   m. Bent pushrod(s).
   n. Damaged cam follower.
2. Piston and piston rings:
   a. Worn piston rings.
   b. Damaged piston rings.
   c. Piston seizure or piston damage.
3. Crankcase and crankshaft:
   a. Seized connecting rod.
   b. Damaged crankcase.
   c. Damaged oil seals.

POOR IDLE SPEED PERFORMANCE

If the engine starts, but idle performance is poor, check the following:

1. Clogged or damaged air filter element.

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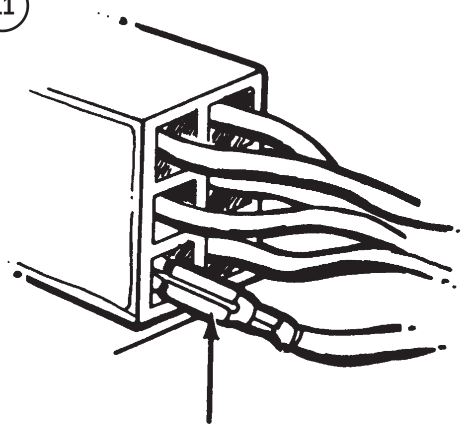

2. Carburetor:
   a. Plugged pilot jet.
   b. Loose pilot jet.
   c. Damaged choke system.
   d. Incorrect throttle cable adjustment.
   e. Incorrect pilot screw adjustment.
   f. Flooded carburetor (visually check carburetor overflow hose for fuel).
   g. Throttle valve does not slide smoothly in carburetor bore.
   h. Loose carburetor.
   i. Damaged intake manifold O-ring.
   j. Incorrect idle speed.
   k. Incorrect air/fuel mixture.
3. Fuel:
   a. Water and/or alcohol in fuel.
   b. Old fuel.
4. Engine: Low engine compression.
5. Electrical system:
   a. Damaged spark plug.
   b. Open or shorted spark plug wire.
   c. Damaged ignition coil.
   d. Faulty ignition or engine stop switch.
   e. Damaged ignition pulse generator.
   f. Damaged ICM unit.
   g. Damaged exciter coil.

POOR MEDIUM AND HIGH SPEED PERFORMANCE

Check the following:
1. Carburetor:
   a. Incorrect fuel level.
   b. Incorrect jet needle clip position.
   c. Plugged or loose main jet.
   d. Plugged fuel line.
   e. Plugged fuel valve.
   f. Plugged fuel tank vent hose.
2. Plugged air filter element.
3. Engine:
   a. Incorrect valve timing.
   b. Weak valve springs.
4. Other considerations:
   a. Overheating.
   b. Clutch slip.
   c. Brake drag.
   d. Engine oil level too high.

ELECTRICAL TESTING

This section describes basics electrical testing and the use of equipment.

Preliminary Checks and Precautions

Before starting any electrical troubleshooting procedure, perform the following:
1. Check the main fuse (Chapter Nine). If the fuse is blown, replace it.
2. Inspect the battery. Make sure it is fully charged, and the battery leads are clean and securely attached to the battery terminals. Refer to *Battery* in Chapter Three.

NOTE
Always consider electrical connectors the weak link in the electrical system. Dirty, loose-fitting and corroded connectors cause numerous electrical related problems, especially on high-mileage vehicles. When troubleshooting an electrical problem, carefully inspect the connectors and wiring harness.

3. Disconnect each electrical connector in the suspect circuit. Check the terminals on both sides of the electrical connector. They should be clean and straight. A bent terminal (**Figure 10**) does not connect to its mate, causing an open circuit.
4. Make sure the terminal on the end of each wire (**Figure 11**) is pushed all the way into the connector.

If not, carefully push them in with a narrow blade screwdriver.

5. Check the wires where they enter the connectors for damage.

6. Clean and pack the connectors with a dielectric grease.

7. Push the connector halves together. Make sure the connectors are fully engaged and locked together (**Figure 12**).

8. Never pull the electrical wires when disconnecting an electrical connector—pull only on the connector plastic housing.

9. Never use a self-powered test light on circuits that contain solid-state devices. The solid-state devices may be damaged.

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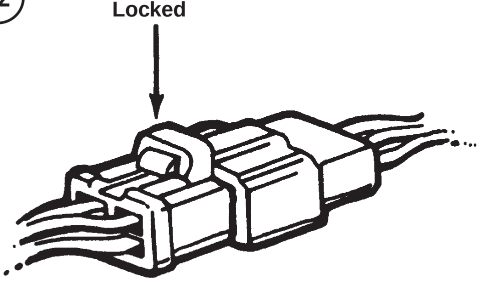

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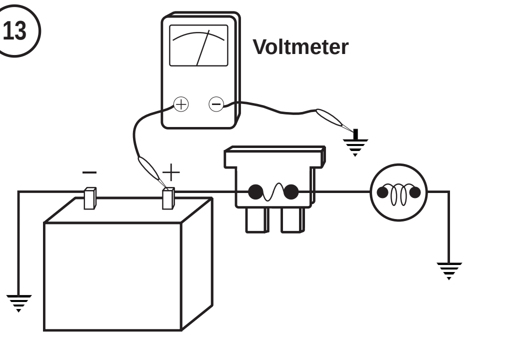


Electrical Component Replacement

Most ATV dealerships and parts suppliers do not accept the return of any electrical part. If the *exact* cause of any electrical system malfunction cannot be determined, have a Honda dealership retest that specific system to verify the test results. If you purchase a new electrical component(s), install it, and then find that the system still does not work properly, the unit probably cannot be returned for a refund.

Consider any test results carefully before replacing a component that tests only *slightly* out of specification, especially resistance. A number of variables can affect test results dramatically. These include the testing meter's internal circuitry, ambient temperature and conditions under which the machine has been operated. All instructions and specifications have been checked for accuracy; however, successful test results depend, to a great degree, upon individual accuracy.

Test Light or Voltmeter

A test light can be constructed from a 12-volt light bulb with a pair of test leads soldered to the bulb. To check for battery voltage in a circuit, attach one lead to ground and the other lead to various points along the circuit. The bulb lights when voltage is present.

A voltmeter is used in the same manner as the test light to find out if voltage is present in any given circuit. The voltmeter, unlike the test light, also indicates how much voltage is present at each test point.

When using a voltmeter, attach the red lead to the component or wire to be checked and the negative lead to a good ground (**Figure 13**).

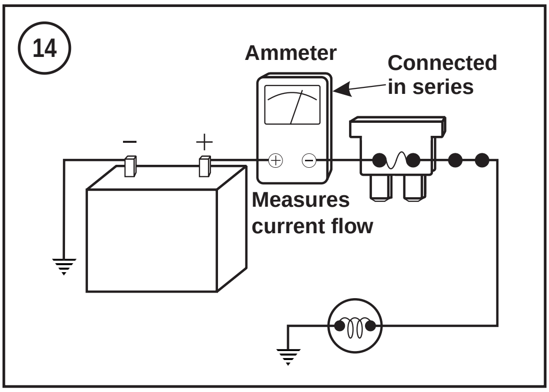
Ammeter

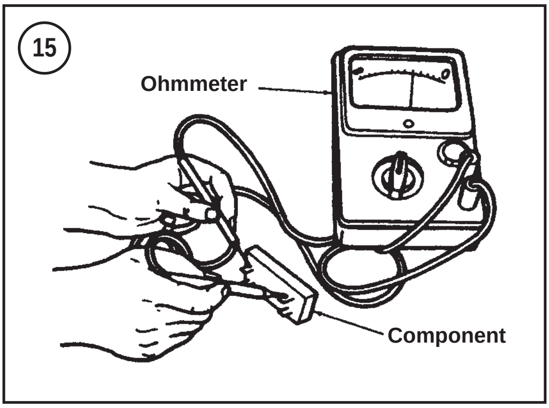
An ammeter measures the flow of current (amps) in a circuit (**Figure 14**). When connected in series in the circuit, the ammeter determines if current is flowing through the circuit and if that current flow is excessive because of a short in the circuit. Current flow is often referred to as current draw. Comparing actual current draw in the circuit or component to the manufacturer's specified current draw provides useful diagnostic information.

Self-powered Test Light

A self-powered test light can be constructed from a 12-volt light bulb, a pair of test leads and a 12-volt battery. When the test leads are touched together the light bulb should go on.

Use a self-powered test light as follows:





1. Touch the test leads together to make sure the light bulb goes on. If not, correct the problem before using it in a test procedure.
2. Disconnect the motorcycle's battery or remove the fuse(s) that protects the circuit to be tested.
3. Select two points within the circuit where there should be continuity.
4. Attach one lead of the self-powered test light to each point.
5. If there is continuity, the self-powered test light bulb comes on.
6. If there is no continuity, the self-powered test light bulb does not come on, indicating an open circuit.

Ohmmeter

CAUTION
Never connect an ohmmeter to a circuit that has power applied to it. Always disconnect the battery negative lead before using an ohmmeter.

An ohmmeter measures the resistance (in ohms) to current flow in a circuit or component. Like the self-powered test light, an ohmmeter contains its own power source and should not be connected to a live circuit.

Ohmmeters may be analog type (needle scale) or digital type (LCD or LED readout). Both types of ohmmeters have a switch which allows you to select different ranges of resistance for accurate readings. The analog ohmmeter also has a set-adjust control which is used to zero, or calibrate, the meter (digital ohmmeters do not require calibration).

An ohmmeter is used by connecting its test leads to the terminals or leads of the circuit or component to be tested (**Figure 15**). If an analog meter is used, it must be calibrated by touching the test leads together and turning the set-adjust knob until the meter needle reads zero. When the leads are uncrossed, the needle should move to the other end of the scale, indicating infinite resistance.

During a continuity test, a reading of infinity indicates there is an open in the circuit or component. A reading of zero indicates continuity, that is, there is no measurable resistance in the circuit or component being tested. If the meter needle falls between these two ends of the scale, this indicates the actual resistance to current flow that is present.

Jumper Wire

A jumper wire is a simple way to bypass a potential problem and isolate it to a particular point in a circuit. If a faulty circuit works properly with a jumper wire installed, an open circuit exists between the two jumper points.

To troubleshoot with a jumper wire, first use the wire to determine if the problem is on the ground or load side of a device. In the example shown in **Figure 16**, test the ground by connecting a jumper between the lamp and a good ground. If the lamp comes on, the problem is the connection between the lamp and ground. If the lamp does not come on with the jumper installed, the lamp's connection to ground is good so the problem is between the lamp and power source.

To isolate the problem, connect the jumper between the battery and the lamp. If it comes on, the problem is between these two points. Next, connect the jumper between the battery and the fuse side of the switch. If the lamp comes on, the switch is good.

By successively moving the jumper from one point to another, the problem can be isolated to a particular place in the circuit.

Note the following when using a jumper wire:

1. Make sure the jumper wire gauge (thickness) is the same as that used in the circuit being tested. Smaller gauge wire rapidly overheats and could melt.

2. Install insulated boots over alligator clips. This prevents accidental grounding, sparks or possible shock when working in cramped quarters.

3. Jumper wires are temporary test measures only. Do not leave a jumper wire installed as a permanent solution. This creates a fire hazard that could easily lead to complete loss of the ATV.

4. When using a jumper wire, always install an inline fuse/fuse holder (available at most auto supply stores or electronic supply stores) to the jumper wire. Never use a jumper wire across any load (a component that is connected and turned on). This causes a direct short and blows the fuse(s).

Voltage Test

Unless otherwise specified, all voltage tests are made with the electrical connector still connected. Insert the test leads into the backside of the connector and make sure the test lead touches the electrical terminal within the connector. If the test lead only touches the wire insulation, a false reading occurs.

Always check both sides of the connector because one side may be loose or corroded, thus preventing electrical flow through the connector. This type of test can be performed with a test light or voltmeter. A voltmeter gives the best results.

1. Attach the voltmeter's negative test lead to a good ground. Make sure the part used for ground is not insulated with a rubber gasket or rubber grommet.

2. Attach the voltmeter positive test lead to the point that needs checking (**Figure 13**).

3. Turn the ignition switch on. If using a test light, the test light comes on if voltage is present. If using a voltmeter, note the voltage reading. The reading should be within 1 volt of battery voltage. If the voltage is less, there is a problem in the circuit.

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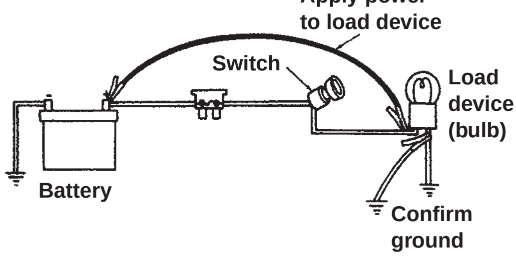


Voltage Drop Test

Because resistance causes voltage to drop, it can be determined in an active circuit using a voltmeter. This is called a voltage drop test. A voltage drop test measures the difference between the voltage at the beginning of the circuit and the available voltage at the end of the circuit while the circuit is operating. If the circuit has no resistance, there is no voltage drop and the voltmeter indicates 0 volts. The greater the resistance in a circuit, the greater the voltage drop reading. A voltage drop of 1 or more volts indicates that a circuit has excessive resistance.

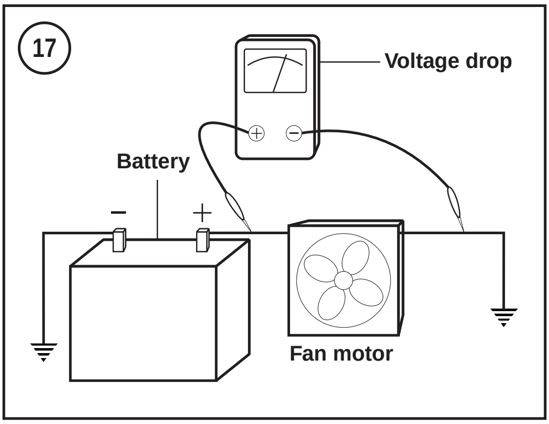
It is important to remember that a 0 reading on a voltage drop test is good. Battery voltage, on the other hand, indicates an open circuit. A voltage drop test is an excellent way to check the condition of solenoids, relays, battery cables and other high-current electrical components.

1. Connect the voltmeter positive test lead to the end of the wire or switch closest to the battery.
2. Connect the voltmeter negative test lead to the other end of the wire or switch (**Figure 17**).
3. Turn the components on in the circuit.
4. The voltmeter should indicate 0 volts. If there is a drop of 1 volt or more, there is a problem within the circuit. A voltage drop reading of 12 volts indicates an open in the circuit.

Peak Voltage Test

A peak voltage test checks the voltage output at normal cranking speed. This test makes it possible to identify ignition system problems quickly and accurately.

Peak voltage testing requires the Honda peak voltage adapter (part No. 07HGJ-0020100) and



commercially available digital multimeter (minimum impedance: 10 M ohms/DCV). If these tools are not available, refer to a Honda dealership.

WARNING
High voltage is present during ignition system operation. Do not touch ignition components, wires or test leads while cranking or running the engine.

NOTE
*All peak voltage specifications are **minimum** values. If the measured voltage meets or exceeds the specification, the test results are satisfactory. On some components, the voltage may greatly exceed the minimum specification.*

Continuity Test

A continuity test is used to determine the integrity of a circuit, wire or component. A circuit has continuity if it forms a complete circuit, that is, if no opens are in either the electrical wires or components within the circuit. A circuit with an open has no continuity.

This type of test can be performed with a self-powered test light or an ohmmeter. An ohmmeter gives the best results. If using an analog ohmmeter, calibrate the meter by touching the leads together and turning the calibration knob until the meter reads zero.

1. Disconnect the negative battery cable.
2. Attach one test lead (test light or ohmmeter) to one end of the part of the circuit to be tested.
3. Attach the other test lead to the other end of the part or the circuit to be tested.
4. The self-powered test light comes on if there is continuity. An ohmmeter reads 0 or very low resistance if there is continuity. A reading of infinite resistance indicates no continuity; the circuit has an open.

Testing for a Short with a Self-powered Test Light or Ohmmeter

1. Disconnect the negative battery cable.
2. Remove the blown fuse from the fuse holder.
3. Connect one test lead of the test light or ohmmeter to the load side (battery side) of the fuse terminal in the fuse holder.
4. Connect the other test lead to a good ground. Make sure the part used for a ground is not insulated with a rubber gasket or rubber grommet.
5. With the self-powered test light or ohmmeter attached to the fuse terminal and ground, wiggle the wiring harness relating to the suspect circuit at 15.2 cm (6 in.) intervals. Start next to the fuse holder and work away from it. Watch the self-powered test light or ohmmeter as progressing along the harness.
6. If the test light blinks or the needle on the ohmmeter moves, there is a short-to-ground at that point in the harness.

Testing For a Short with a Test Light or Voltmeter

1. Remove the blown fuse from the fuse holder.
2. Connect the test light or voltmeter across the fuse terminals in the fuse holder. Turn the ignition switch on and check for battery voltage.
3. With the test light or voltmeter attached to the fuse terminals, wiggle the wiring harness relating to the suspect circuit at 15.2 cm (6 in.) intervals. Start next to the fuse holder and work away from it, watching the test light or voltmeter while progressing along the harness.
4. If the test light blinks or if the needle on the voltmeter moves, there is a short-to-ground at that point in the harness.

STARTING SYSTEM

This section describes troubleshooting procedures for the electric starting system. An ohmmeter

and jumper cables are required to perform many of these procedures.

Before troubleshooting the starting circuit, make sure:

1. The battery is fully charged.
2. Battery cables are the proper size and length. Replace undersized or damaged cables.
3. All electrical connections are clean and tight.
4. The wiring harness is in good condition, with no worn or frayed insulation or loose harness sockets.
5. The fuel system is filled with an adequate supply of fresh gasoline.

Operation

An electric starter (**Figure 18**) is used on all models. The starter is mounted horizontally at the left side of the engine.

The electric starting system requires a fully charged battery to provide the large amount of current required to operate the starter. A charge coil on the stator plate and a voltage regulator, connected in circuit with the battery, keeps the battery charged while the engine is running. The battery can also be charged externally.

The starting circuit consists of the battery, starter, neutral/reverse switch, neutral indicator, starter relay, ignition switch and engine stop switch.

The starter relay (**Figure 19**) carries the heavy electrical current to the starter. Depressing the starter switch sends control current through the starter relay coil. The starter relay contacts close so load current flows from the battery through the starter relay to the starter.

When the ignition switch is turned on and the engine stop switch is in run, the starter can be operated only if the transmission is in neutral.

CAUTION

Do not operate the starter continuously for more than 5 seconds. Allow the starter to cool for at least 10 seconds between attempts to start the engine.

Starter Does Not Operate

If the starter does not operate, perform the following tests:

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1. Remove the seat, side covers, upper fuel tank cover and front fender as described in Chapter Fourteen.
2. Check the 15-amp main fuse. Open the fuse holder (**Figure 20**), pull the fuse out and visually inspect it. If the fuse is blown, replace it as described in Chapter Nine. If the main fuse is good, reinstall it, and continue with Step 3.
3. Test the battery as described in Chapter Three. If the battery is damaged, replace it.
4. Check for loose, corroded or damaged battery cables. Check the cables at the battery, starter, starter relay and all cable-to-frame connections.
5. Turn the ignition switch on. Push the starter button and listen for a click at the starter relay switch (**Figure 19**).
   a. If the relay clicks, perform Step 6.
   b. If the relay does not click, go to Step 7.
6. Test the battery as follows:
   a. Park the vehicle on level ground and set the parking brake. Shift the transmission into neutral.


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b. Remove the fuel tank as described in Chapter Eight.

c. Disconnect the cable (**Figure 21**) from the starter terminal.

WARNING
Because a spark is produced in the following steps, perform this procedure away from all open flames. Make sure there is no spilled gasoline on the ATV or gasoline fumes in the work area.

d. Momentarily connect a jumper cable (thick gauge wire) from the positive battery terminal to the starter terminal. The starter works properly if it turns when connected directly to the battery.

e. If the starter does not turn, remove the starter and service it as described in Chapter Nine.

f. If the starter turns, check for a loose or damaged starter cable. If the cable is good, the starter relay (**Figure 19**) is faulty. Replace the starter relay and retest.

7. Check that the neutral indicator light (**Figure 22**) comes on when the transmission is in neutral and the ignition switch is on. Note the following:
   a. If the neutral indicator light does not work properly, check for a blown bulb. If the bulb works, perform Step 8.
   b. If the neutral indicator light works properly, go to Step 9.

8. Test the following items as described in Chapter Nine:
   a. Neutral/reverse switch.
   b. Ignition switch.
   c. Diode.

9. Check the voltage of the starter relay as described in Chapter Nine. Note the following:
   a. If the voltmeter shows battery voltage, continue with Step 10.
   b. If there is no voltage reading, check the ignition switch and starter switch as described in Chapter Nine. If both switches work, check the continuity of the yellow/red wire between the starter switch and the starter relay.

10. Perform the starter relay continuity test as described in Chapter Nine. Note the following:
   a. If the starter relay passes both portions of the test, continue with Step 11.
   b. If the starter relay fails either portion of the test, replace the starter relay.

11. If the starting system problem is not determined after performing these steps in order, recheck the wiring system for dirty or loose-fitting terminals or damaged wires. Clean and repair them as required.

12. Make sure all connectors disconnected during this procedure are free of corrosion and reconnected properly.

Starter Turns Slowly

If the starter turns slowly and all engine components operate normally, perform the following:

1. Test the battery as described in Chapter Three.

2. Check for the following:
   a. Loose or corroded battery terminals.
   b. Loose or corroded battery ground cable.
   c. Loose starter cable.
3. Remove, disassemble and bench test the starter as described in Chapter Nine.
4. Check the starter for binding during operation. Disassemble the starter and check the armature shaft for bending or damage. Also check the starter clutch as described in Chapter Five.

Starter Turns but the Engine Does Not

If the starter turns but the engine does not, perform the following:
1. Check for a damaged starter clutch (Chapter Five).
2. Check for damaged starter reduction gears (Chapter Five).

CHARGING SYSTEM

The charging system consists of the battery, alternator and a voltage regulator/rectifier. The 15-amp main fuse protects the circuit.

A malfunction in the charging system generally causes the battery to remain undercharged.

Battery Discharging

1. Check all connections. Make sure they are tight and free of corrosion.
2. Perform the *Regulated Voltage Test* described in Chapter Nine.
   a. If the voltage is within specification, perform Step 3.
   b. If the voltage is outside the specified range, perform Step 5.
3. Perform the *Current Draw Test* as described in Chapter Nine. Note the following:
   a. If the current draw exceeds 0.1mA, replace the battery.
   b. If the current draw is 0.1mA or less, perform Step 4.
4. Disconnect the regulator/rectifier connector, and repeat the *Current Draw Test*.
   a. If the current draw exceeds 0.1mA, check for a shorted wire harness or faulty ignition switch.
   b. If the current draw is 0.1mA or less, replace the regulator/rectifier.
5. Check the battery lead as described in *Regulator/Rectifier Harness Test* in Chapter Nine.
   a. If the voltage reading is within specification, perform Step 6.
   b. If the voltage reading is outside the specified range, check for a short in the harness or for loose, dirty connections.
6. Check the charge leads as described in *Regulator/Rectifier Harness Test* in Chapter Nine.
   a. If the resistance is within the specified range, replace the regulator/rectifier.
   b. If the resistance is outside the specified range, perform Step 7.
7. Check the resistance of the stator coil as described in Chapter Nine.
   a. If the resistance is within specification, replace the charging coil.
   b. If the resistance is outside the specified range, check for dirty or loose-fitting alternation connections.

Battery Overcharging

1. Check all connections. Make sure they are tight and free of corrosion.
2. Perform the *Regulated Voltage Test* described in Chapter Nine.
   a. If the voltage is within specification, replace the battery.
   b. If the voltage greatly exceeds the specified range, perform Step 3.
3. Check the continuity of the regulator/rectifier connector as described by *Charge Coil Resistance Test* in Chapter Nine.
   a. If the connector does not have continuity, check for a loose regulator/rectifier connector. If the connection is good, replace the regulator/rectifier.
   b. If the connector has continuity, check for a poor connection or an open in the wire harness.

IGNITION SYSTEM

Tools

Honda recommends the use of either a peak voltage tester or the Honda peak voltage adapter (part

no. 07HGJ-0020100) with a commercially available digital multimeter (minimum impedance of 10M ohms/DVC) for troubleshooting the ignition system. If these tools are unavailable, refer testing to a Honda dealership.

No Spark at the Spark Plug

1. Perform the *Spark Test* described in this chapter.
2. Check the spark plug cap and spark plug wire.
3. Perform the ignition coil primary peak voltage test, the exciter coil peak voltage test and the ignition pulse generator peak voltage test described in Chapter Nine. Write down the results of each test. If the results of any of the peak voltage test are under the specifications in **Table 1** of Chapter Nine, check the following conditions that best describe the faulty test results, and test and replace the necessary components.
4. If the ignition coil primary peak voltage is low, check the following conditions. If the test result remains low, replace the components in the order specified:
   a. Check the peak voltage adapter connections. The system is normal if the measured voltage exceeds the standard voltage at least once. A low reading may indicate reversed connections.
   b. Check the impedance of the multimeter. It must be at least 10 M ohms VDC.
   c. Check the battery state of charge. If it is low, the cranking speed may have been to slow during the test.
   d. If using a peak voltage tester, check to make sure the sampling time and measured pulse were not synchronized. The system is normal if the measured voltage exceeds the standard voltage at least once.
   e. Check for poor connections or a short in the ignition circuit as described in Chapter Nine.
   f. Check the neutral switch as described in *Switches* in Chapter Nine.
   g. Replace the neutral switch.
   h. Replace the exciter coil.
   i. Replace the ignition coil.
   j. Replace the ignition control module (ICM).
5. If there is no ignition coil primary peak voltage reading, check the following conditions. If the test result remains low, replace the components in the order specified:
   a. Check the peak voltage adapter connections. The system is normal if the measured voltage exceeds the standard voltage at least once. A low reading may indicate reversed connections.
   b. Check for a short in the engine stop switch or ignition as described in *Switches* in Chapter Nine.
   c. Check for short or poor connection in the ICM.
   d. Check for a short or a poor connection in the green/white wire of the ICM.
   e. Check for a short in the neutral switch as described in *Switches* in Chapter Nine.
   f. Replace the neutral switch.
   g. Replace the peak voltage adaptor.
   h. Replace the exciter coil.
   i. Replace the ignition pulse generator.
   j. If all other procedures test correct, or components have been replaced and there is still no reading replace the ICM.
6. If the ignition coil primary peak voltage is normal, but there is not spark at the plug, check the following conditions and replace the specified component if necessary:
   a. Check the spark plug.
   b. Check the ignition coil for leaking current in the secondary winding .
   c. Replace the ignition coil.
7. If the exciter coil peak voltage is low, check the following conditions. If the test result remains low, replace the specified component:
   a. Check the impedance of the multimeter. It must be at least 10 M ohms VDC.
   b. Check the battery state of charge. If it is low, the cranking speed was too slow during the test.
   c. If using a peak voltage tester, check to make sure the sampling time and measured pulse were not synchronized. The system is normal if the measured voltage exceeds the standard voltage at least once.
   d. Faulty exciter coil, replace the stator.
8. If there is no reading for the exciter coil peak voltage, check the following conditions. If the test result remains the same, replace the specified component:
   a. Check the peak voltage adapter or the peak voltage tester.
   b. Faulty exciter coil, replace the stator.
9. If the peak voltage reading of the ignition pulse generator is low, check the following conditions. If

the test result remains low, replace the specified component:

a. Check the impedance of the multimeter. It must be at least 10 M ohms VDC.
b. Check the charge of the battery. If it is low, the cranking speed was too slow during the test.
c. If the testing is done using a peak voltage tester, make sure the sampling time and measured pulse were not synchronized. The system is normal if the measured voltage exceeds the standard voltage at least once.
d. Replace the ignition pulse generator.

10. If there is no peak voltage reading for the ignition pulse generator, check the following conditions. If the test result remains the same, replace the specified component:

a. Check the peak voltage adapter and peak voltage tester.
b. Replace the ignition pulse generator.

LIGHTING SYSTEM

System Troubleshooting

If the headlight and/or taillight do not work, perform the following test procedures:

1. Check for a blown bulb as described in this section.
2. Check all lighting system connectors and wires for loose or damaged connections.
3. Check the main fuse as described in Chapter Nine. Replace a blown or damaged fuse.
4. Test the battery as described in Chapter Three. If necessary, clean and recharge the battery. If the battery is damaged or does not hold a charge, replace it. If the ATV was bought used, check the battery to make sure it is the correct type.
5. Test the ignition switch as described in Chapter Nine.
6. If the problem has not been solved, perform the *Lighting System Check* described in this section

Faulty Bulbs

If a headlight or taillight bulb(s) continually burn out, check for one or more of the following conditions:

1. Incorrect bulb type. Refer to Chapter Nine for bulb specifications.
2. Damaged battery.

3. Damaged rectifier/regulator.
4. Damaged ignition switch and/or light switch.

Headlight Operates Darker Than Normal

Check for one or more of the following conditions:

1. Incorrect bulb type. Refer to Chapter Nine for bulb specifications.
2. Charging system problem.
3. Electric accessories added to the wiring harness. Disconnect each accessory one at a time, start the engine and check the headlight operation. If an accessory is the cause of the problem, contact the accessory manufacturer for more information.
4. Incorrect ground connection.
5. Poor main and/or light switch electrical contacts..

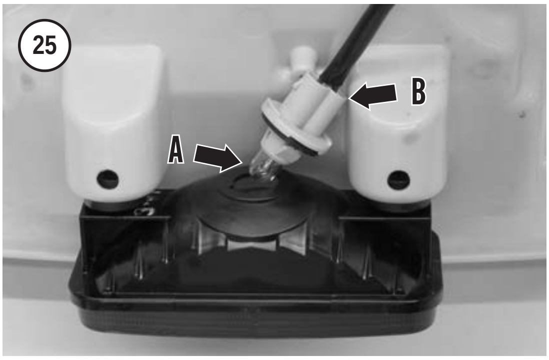
Lighting System Check

Headlight

If the headlights do not come on, perform the following test:

1. Remove the headlight bulb (Chapter Nine), and disconnect the headlight (**Figure 23**) from the main wiring harness.

NOTE
Two green bullet connectors are located in the same area of the frame. Follow the harness from the headlight socket so the correct bullet connector is identified during these tests. Refer to the wiring diagram at the end of this manual.



a. Connect an ohmmeter to the contacts on the back side of the bulb socket (**Figure 24**). The reading should be 0 ohms. Replace the bulb if the ohmmeter indicates an open circuit.

b. Check the continuity of the headlight socket. Remove the headlight bulb from the socket. Connect the ohmmeter to each socket terminal and it's corresponding contact on the back of the socket. Each terminal should have continuity. If a terminal does not have continuity, replace the headlight socket.

2. Install the headlight bulb into its socket and reconnect the socket bullet connectors to their mates from the wiring harness. Do not install the socket into its headlight housing. The headlight bulb and socket must be connected to the wiring harness when making the following tests.

3. Switch a voltmeter to its DC20V scale. In Step 4 and Step 5, carefully test the bullet connectors while they are connected to the main wiring harness.

4. Connect the voltmeter positive lead to the headlight connector white lead and the voltmeter negative lead to the headlight connector green lead. Turn the ignition switch on and the dimmer switch to low. Note the voltmeter reading:

a. If the voltmeter reads 12 volts, continue with Step 5.

b. If the voltmeter does not read 12 volts, check the wiring harness from the ignition switch to the headlight socket for damage.

5. Turn the ignition switch off. Connect the voltmeter positive lead to the headlight connector blue lead and the voltmeter negative lead to the headlight connector green lead. Turn the ignition switch on and the dimmer switch to high. Note the voltmeter reading:

a. If the voltmeter reads 12 volts, continue with Step 6.

b. If the voltmeter does not read 12 volts, check the wiring harness from the ignition switch to the headlight socket for damage.

6. Turn the ignition switch off and disconnect the voltmeter leads. If the voltmeter read 12 volts for both tests (Step 4 and Step 5), the headlight wiring is good.

Taillight

If the taillight does not turn on, perform the following test:

1. Remove the taillight bulb (A, **Figure 25**) as described in Chapter Nine, and disconnect the taillight bullet connectors from the wiring harness.

a. Connect an ohmmeter to the bulb terminals. The reading should be 0 ohms. Replace the bulb if the ohmmeter reads infinity.

b. Check the continuity of the taillight wires. Connect an ohmmeter to one terminal in the taillight socket (B, **Figure 25**) and to the taillight side of its related bullet connector. Repeat for the other wire. Each reading should be 0 ohms. If any reading indicates an open circuit, replace the taillight socket if it cannot be repaired.

2. Install the taillight bulb into its socket and reconnect the socket bullet connectors to the main wiring harness. Do not reinstall the socket into the taillight housing (mounting position). The taillight bulb and socket must be connected to the main wiring harness when making the following tests.

3. Switch a voltmeter to its DC20V scale. In Step 4, test the taillight socket bullet connectors with the taillight connectors connected to the main wiring harness.

4. Connect the voltmeter positive lead to the taillight connector brown lead and the voltmeter negative lead to the taillight connector green lead. Turn the ignition switch on and note the voltmeter reading:
   a. If the voltmeter reads 12 volts, continue with Step 5.
   b. If the voltmeter does not read 12 volts, check the wiring harness from the ignition switch to the taillight socket for damage.
5. Turn the ignition switch off and disconnect the voltmeter leads. If the voltmeter reads 12 volts in Step 4, the taillight wiring is good.

FUEL SYSTEM

Fuel system troubleshooting is covered in *Engine Will Not Start, Poor Idle Speed Performance* and *Poor Medium and High Speed Performance* in this chapter.

ENGINE OVERHEATING

Engine overheating can quickly cause engine seizure and damage. The following section lists the probable causes that can lead to engine overheating.
1. Ignition system:
   a. Incorrect spark plug gap.
   b. Incorrect spark plug heat range. Refer to Chapter Three.
   c. Faulty ICM incorrect ignition timing.
2. Engine compression system:
   a. Cylinder head gasket leak.
   b. Heavy carbon buildup in combustion chamber.
3. Engine lubrication system:
   a. Incorrect oil level.
   b. Incorrect oil viscosity.
   c. Faulty oil pump.
   d. Plugged oil line.
4. Fuel system:
   a. Carburetor fuel level too low.
   b. Incorrect carburetor adjustment or jetting.
   c. Loose carburetor boot clamps.
   d. Leaking or damaged carburetor-to-air filter housing air boot.
   e. Incorrect air/fuel mixture.
5. Engine load:
   a. Dragging brake(s).
   b. Damaged drive train components.
   c. Slipping clutch.
   d. Engine oil level too high.

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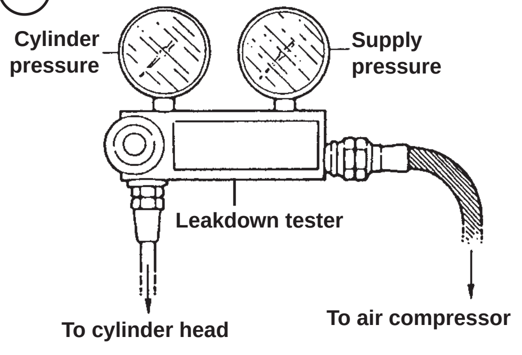


ENGINE

Preignition

Preignition is the premature burning of fuel and is caused by hot spots in the combustion chamber. The fuel ignites before spark ignition occurs. Glowing deposits in the combustion chamber, inadequate cooling or an overheated spark plug can all cause preignition. This is first noticed as a power loss but eventually causes damage to internal parts of the engine because of higher combustion chamber temperature.

Detonation

Commonly called spark knock or fuel knock, detonation is the violent explosion of fuel in the combustion chamber instead of the controlled burn that occurs during normal combustion. Severe damage can result. Use of low octane gasoline is a common cause of detonation.

Even when using a high octane gasoline, detonation can still occur. Other causes are over-advanced ignition timing, lean fuel mixture at or near full throttle, inadequate engine cooling, or the excessive accumulation of carbon deposits in the combustion chamber and on the piston crown.

Power Loss

Several factors can cause a lack of power and speed. Look for a clogged air filter or a fouled or damaged spark plug. A galled piston or cylinder, incorrect piston clearance or worn or sticking piston rings may be responsible. Look for loose bolts, de-

fective gaskets or leaking machined mating surfaces on the cylinder head, cylinder or crankcase.

Piston Seizure

Piston seizure can be caused by incorrect piston-to-cylinder clearance, piston rings with an improper end gap, compression leak, incorrect air/fuel mixture, spark plug of the wrong heat range or incorrect ignition timing. Overheating from any cause may cause piston seizure.

Piston Slap

Piston slap is an audible slapping or rattling noise resulting from excessive piston-to-cylinder clearance. If allowed to continue, piston slap eventually causes the piston skirt to crack and shatter.

To prevent piston slap, clean the air filter element on a regular schedule. If you hear piston slap, disassemble the engine top end and measure the cylinder bore and piston diameter and check for excessive clearance. Replace parts that exceed service limits or show damage.

ENGINE NOISES

1. Knocking or pinging during acceleration can be caused by using a lower octane fuel than recommended or a poor quality of fuel. Incorrect carburetor jetting or a spark plug that is too hot can also cause pinging. Refer to *Spark Plug* in Chapter Three. Check also for excessive carbon buildup in the combustion chamber or for a faulty ICM.
2. Slapping or rattling noises at low speed or during acceleration can be caused by excessive piston-to-cylinder clearance. Check also for a bent connecting rod or worn piston pin and/or piston pin holes in the piston.
3. A knocking or rapping while decelerating usually is caused by excessive rod bearing clearance.
4. Persistent knocking and vibration or other noise—Usually caused by worn main bearings. If the main bearings are good, consider the following:
   a. Loose engine mounts.
   b. Cracked frame.
   c. Leaking cylinder head gasket.
   d. Exhaust pipe leak at cylinder head.
   e. Stuck piston ring.
   f. Broken piston ring.
   g. Partial engine seizure.
   h. Excessive connecting rod small end bearing clearance.
   i. Excessive connecting rod big end side clearance.
   j. Excessive crankshaft runout.
   k. Worn or damaged primary drive gear.
5. Rapid on-off squeal can be caused by a compression leak around cylinder head gasket or spark plug.

CYLINDER LEAKDOWN TEST

A cylinder leakdown test can determine if an engine problem is caused by leaking valves, a blown head gasket or broken, worn or stuck piston rings. A cylinder leakdown test is performed by applying compressed air to the cylinder, and then measuring the amount it leaks as a percentage. A cylinder leakdown tester (**Figure 26**) and an air compressor are required to perform this test. Follow the manufacturer's directions, along with the following information when performing a cylinder leakdown test.

1. Start and run the engine until it reaches normal operating temperature, and turn the engine off.
2. Remove the air filter element as described in Chapter Three. Open and secure the throttle in the wide-open position.
3. Set the piston to TDC on its compression stroke. Refer to *Valve Clearance* in Chapter Three.
4. Remove the spark plug.

NOTE

The engine may turn when air pressure is applied to the cylinder. To prevent this, shift the transmission into fifth gear and set the parking brake.

5. Install the cylinder leakdown tester into the spark plug hole (**Figure 27**).
6. Perform a cylinder leakdown test following the manufacturer's instructions. Listen for leaking air while noting the following:
   a. Air leaking through the exhaust pipe indicates a leaking exhaust valve.
   b. Air leaking through the carburetor indicates a leaking intake valve.
   c. Air leaking through the crankcase breather tube indicates worn piston rings.
7. A cylinder leaking 10 percent or more requires service.
8. Remove the tester and reinstall the spark plug.

CLUTCH

The TRX250EX uses two clutch assemblies: a centrifugal clutch (A, **Figure 28**) and a change clutch (B).

All clutch service, except adjustment, requires partial engine disassembly to identify and repair the problem. Refer to Chapter Six.

Clutch Slip

1. Clutch wear or damage:
   a. Incorrect clutch adjustment.
   b. Worn clutch shoe (centrifugal clutch).
   c. Loose, weak or damaged clutch spring (change and centrifugal clutch).
   d. Worn friction discs (change clutch).
   e. Warped clutch plates (change clutch).
   f. Worn clutch center and/or clutch housing (change clutch).
   g. Incorrectly assembled clutch.
2. Engine oil:
   a. Low oil level.
   b. Oil additives.
   c. Low viscosity oil.

Clutch Drag

1. Clutch wear or damage:
   a. Incorrect clutch adjustment.
   b. Damaged or incorrectly assembled clutch lever assembly.
   c. Warped clutch plates.
   d. Swollen friction discs.
   e. Warped pressure plate.
   f. Incorrect clutch spring tension.
   g. Incorrectly assembled clutch.
   h. Loose clutch nut.
   i. Incorrect clutch mechanism adjustment (change clutch).
2. Engine oil:
   a. Oil level too high.
   b. High viscosity oil.

Vehicle Creeps with Clutch Disengaged

1. Damaged centrifugal clutch.
2. Warped drive plate (centrifugal clutch).

Rough Clutch Operation

1. Damaged clutch housing slots (change clutch).
2. Damaged clutch center splines (change clutch).
3. Incorrect engine idle speed.

Transmission is Difficult to Shift

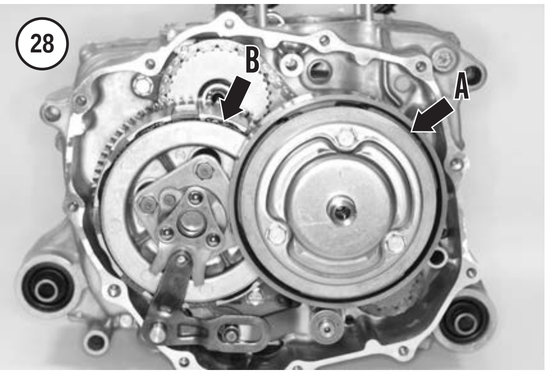
1. Clutch wear or damage:
   a. Incorrect clutch adjustment.
   b. Damaged clutch lifter mechanism.
2. Damaged shift drum shifter plate.

TRANSMISSION

Transmission symptoms can be difficult to distinguish from clutch symptoms. Make sure the clutch is not causing the trouble before working on the transmission.

Difficult Shifting

If the shift shaft does not move smoothly from one gear to the next, check the following:
1. Shift shaft:
   a. Incorrectly installed shift lever.
   b. Stripped splines on gearshift spindle, sub-gearshift spindle arm or sub-gearshift spindle.
   c. Bent sub-gearshift spindle.
   d. Damaged sub-gearshift spindle return spring.
   e. Damaged gearshift linkage assembly where it engages the shift drum.
   f. Stopper arm binding on pivot bolt.
2. Stopper arm:
   a. Seized or damaged stopper arm roller.



b. Weak or damaged stopper arm spring.
c. Loose stopper arm mounting bolt.
d. Incorrectly assembled stopper arm assembly.

3. Shift drum and shift forks:
   a. Bent shift fork(s).
   b. Damaged shift fork guide pin(s).
   c. Seized shift fork (on shaft).
   d. Broken shift fork or shift fork shaft.
   e. Damaged shift drum groove(s).
   f. Damaged shift drum bearing surfaces.

Gears Pop Out Of Mesh

If the transmission shifts into gear but then slips or pops out, check the following:

1. Gearshift linkage:
   a. Incorrectly assembled sub-gearshift spindle and gearshift A arm assembly.
   b. Stopper arm fails to move or set properly.
2. Shift drum:
   a. Incorrect thrust play.
   b. Worn or damaged shift drum groove(s).
3. Shift fork(s)
   a. Bent or damaged shift fork.
   b. Bent or damaged shift fork shaft.
4. Transmission:
   a. Worn or damaged gear dogs.
   b. Excessive gear thrust play.
   c. Worn or damaged transmission shaft circlips or thrust washers.

Transmission Overshifts

If the transmission overshifts when shifting up or down, check for a weak or broken gearshift return spring or a weak or broken stopper arm and spring assembly.

Transmission Fails to Shift into Reverse

If the transmission fails to shift into or operate in reverse properly, check the following:

1. Incorrect reverse cable adjustment.
2. Loose or damaged reverse stopper arm.
3. Damaged reverse stopper shaft.

FINAL DRIVE

Noise is usually the first indication of a final drive problem. It is not always easy to diagnose the source of the noise and the operating conditions that produce it.

Some clues may be gained by noting whether the noise is a hum, growl or knock, whether it is produced when the vehicle is accelerating under load or coasting and whether it is heard when the vehicle is going straight or making a turn.

Final drive service procedures are covered in Chapter Twelve.

CAUTION
Improperly diagnosed noises can lead to rapid and excessive final train wear and damage. If unfamiliar with the operation and repair of the final drive assembly, refer troubleshooting to a qualified repair facility.

Oil Inspection

Drain the gearcase oil (Chapter Three) into a clean container. Wipe a small amount of oil on your finger, and rub the finger and thumb together. Check for the presence of metallic particles. Also check the drain bolt for metal particles. While a small amount of particles in the oil is normal, an abnormal amount of debris is an indication of bearing or gear damage.

Excessive Noise

1. Low oil level.
2. Excessive ring gear and pinion gear backlash.
3. Worn or damaged drive pinion and splines.
4. Damaged driven flange and wheel hub.
5. Worn or damaged driven flange and ring gear shaft.

HANDLING

Poor handling reduces overall performance and may cause loss of control and a crash. Check the following items when experiencing poor handling:

1. If the handlebars are difficult to turn, check for the following:
   a. Low tire pressure.
   b. Incorrect cable routing.
   c. Damaged steering shaft bushing and/or bearing.
   d. Bent steering shaft or frame.
   e. Steering shaft nut too tight.
2. If there is excessive handlebar shake or vibration, check for the following:
   a. Incorrect tire pressure.
   b. Loose or damaged handlebar clamps.
   c. Incorrect handlebar clamp installation.
   d. Bent or cracked handlebar.
   e. Worn wheel bearing(s).
   f. Excessively worn or damaged tire(s).
   g. Damaged rim(s).
   h. Loose, missing or broken engine mount bolts and mounts.
   i. Cracked frame, especially at the steering head.
   j. Damaged shock absorber damper rod.
   k. Leaking shock absorber damper housing.
   l. Sagged shock spring(s).
   m. Loose or damaged shock mount bolts.
3. If the rear suspension is too soft, check for the following:
   a. Damaged shock absorber damper rod.
   b. Leaking shock absorber damper housing.
   c. Sagged shock spring.
   d. Loose or damaged shock mount bolts.
4. If the rear suspension is too hard, check for the following:
   a. Rear tire pressure is too high.
   b. Incorrect shock absorber adjustment.
   c. Damaged shock absorber damper rod.
   d. Leaking shock absorber damper housing.
   e. Sagged shock spring.
   f. Loose or damaged shock mount bolts.
   g. Improperly tightened swing arm pivot.
5. Frame:
   a. Damaged frame.
   b. Cracked or broken engine mount brackets.
6. Wobbling wheel:
   a. Loose wheel nuts.
   b. Loose or incorrectly installed wheel hub.
   c. Excessive wheel bearing play.
   d. Loose wheel bearing.
   e. Bent wheel rim.
   f. Bent frame or other suspension component.
   g. Improperly tightened axle.
   h. Worn swing arm bearings.
7. If vehicle pulls to one side:
   a. Incorrect tire pressure.
   b. Incorrect tie rod adjustment.
   c. Bent or loose tie rod.
   d. Incorrect wheel alignment.
   e. Bent frame or other suspension component.
   f. Weak front shock absorber.

FRAME NOISE

Noises traced to the frame or suspension are usually caused by loose, worn or damaged parts. Noises related to the frame are listed below:

1. Drum brake noise—A screeching sound during braking is the most common drum brake noise. Some other drum brake noises can be caused by:
   a. Glazed brake lining or drum surface.
   b. Excessively worn brake linings.
   c. Warped brake drum.
2. Front or rear shock absorber noise—Check for the following:
   a. Loose shock absorber mounting bolts.
   b. Cracked or broken shock spring.
   c. Damaged shock absorber.
3. Some other frame noises can be caused by:
   a. Cracked or broken frame.
   b. Broken swing arm or shock linkage.
   c. Loose engine mounting bolts.
   d. Damaged steering shaft bearings.
   e. Loose mounting bracket.

BRAKES

The front disc brakes and the rear drum brake are critical to riding performance and safety. Inspect the brakes frequently and repair any problem immediately. When replacing or refilling the front brake fluid, use only DOT 3 or DOT 4 brake fluid from a sealed container. Refer to Chapter Thirteen for additional information on brake fluid selection and brake service.

Front Disc Brake

If the front disc brakes are not working properly, check for one or more of the following conditions:

1. Air in brake line.
2. Brake fluid level too low.
3. Loose brake hose banjo bolts. Brake fluid is leaking out.
4. Loose or damaged brake hose or line.
5. Worn or damaged brake disc.
6. Worn or damaged brake pads.
7. Oil on brake disc or brake pad surfaces.
8. Worn or damaged caliper(s).

Rear Drum Brake

If the rear drum brake is not working properly, check for one or more of the following conditions:

1. Incorrect rear brake adjustment.
2. Incorrect brake cam lever position.
3. Worn or damaged brake drum.
4. Worn or damaged brake linings.
5. Oil on brake drum or brake lining surfaces.
6. Weak or damaged brake return springs.